Gemini User's Committee 2024 Report

The User's Committee for Gemini (UCG) met in a hybrid fashion (both in-person and remotely via Zoom) for two days spanning Wednesday 10/23 and Thursday 10/24. The in-person component of the meeting was held at the Gemini North Base Facility in Hilo, HI.

The UCG members physically present included: Matthew Taylor (chair, University of Calgary), Victoria Reynaldi (Universidad Nacional de La Plata, Buenos Aires), Ana L. Chies-Santos (Universidade Federal do Rio Grande do Sul), David Jones (University of Hawai'i), Charles Schambeau (University of Central Florida), David Trilling (Northern Arizona University), and Vinicius Placco (NOIRLab observer), Minjin Kim (Kyungpook National University).

UCG members remotely present included: Jonathan Gagne (Université de Montréal), Jennifer Burt (Jet Propulsion Laboratory), and Lorenzo Monaco (Universidad Andrés Bello).

Also present: Scott Dahm (Interim Director), Elena Sabbi (Chief Scientist), Andy Adamson (Associate Director Hawai'i Site), Atsuko Nitta (Head of Science, North), Rene Rutton (Head of Science, South), Bill Vacca (Scientist, Gemini North), Susan Ridgway (Scientist, NOIRLab), Mark Rawlings (Scientist, Gemini North), Andy Stephens (Scientist, Gemini North), Siyi Xu (Scientist, NOIRLab), Ally Tapia (Executive Assistant)

New items from UCG 2024 Meeting

Gemini Science Performance and Strategic Plan

Gemini continues to largely follow the strategic plan outlined in 2019, emphasizing flexibility, versatility, and its goal of being the most nimble observatory in the world. The UCG supports this approach as a new strategy for the 2030s is developed, with particular focus on maintaining diverse options for proposal submission, which provide flexible access to Gemini time for its user community. Balancing transient follow-up programs with non-transient science programs should remain a priority, along with continuing to develop in-demand facility-class capabilities through both in-house and visitor instrument pathways. These efforts should build on the recent successes achieved in these areas. Additionally, the design and capabilities of upcoming instrumentation give Gemini a competitive advantage over other 8-10m class telescopes, enhancing its role in supporting and complementing next-generation observatories like JWST, Euclid, Rubin/LSST, and Roman. This advantage should be leveraged as part of the broader strategy. Although it is recognized that Gemini is currently at an intermediate point in its strategic planning cycle, the UCG looks forward to hearing a more detailed vision for the next decade at the next meeting. Maintaining flexibility as a core principle into the 2030s should continue to be a high priority.

The UCG also strongly supports Gemini leadership's focus on supporting the user community, particularly via enhancements to the existing proposal submission, observing, and data reduction software. However, significant concern remains regarding human resources, as the observatory faces clear limitations in this area. To ensure continued progress, the UCG urges that more resources be allocated to the development of key initiatives such as the GPP, DRAGONS, and other data reduction packages. Moreover, the UCG emphasizes the importance of making science-ready data easily accessible to users, aligning with the “if you reduce it, they will come” principle. This approach will be critical in maintaining high oversubscription rates and ensuring continued engagement and timely science publications from both new and existing users.

While Gemini’s recent focus on flexibility and versatility is commendable, the UCG has concerns about the potential for significant resources to be allocated to the "Rocky Worlds" DDT program. While the committee agrees on the scientific and strategic merit of the initiative and its potential to enhance Gemini’s visibility by association with JWST, the program is not sufficiently well defined to allow for meaningful feedback. If this initiative sets a precedent for future strategic investments of Gemini DD time, the UCG recommends establishing a robust process for soliciting future program concepts from the community and then assembling a panel to review and promote the most promising programs to Gemini leadership. The committee also questions why this program cannot follow the traditional peer-reviewed LLP process.

Finally, the UCG notes that the proposed switch to a year-long proposal cycle seems primarily driven by operational benefits rather than scientific ones. The committee expresses concerns that this change could hinder early-career researchers’ development and potentially limit flexibility for smaller partners. Input from the Gemini user community on both the scientific and professional development impacts of this change should be solicited before any final decisions are made. The UCG also advises that flexibility for smaller partners, junior scientists, and coordination with proposal cycles of other observatories (such as JWST) be factored into any decision. While the UCG does not oppose a one-year cycle in principle, it believes that careful consideration is needed to balance flexibility with operational efficiency.

New and Near-future Instruments and Capabilities

The visitor instrument program at Gemini continues to be a notable success, with instruments such as IGRINS/IGRINS-2 and MAROON-X showcasing strong popularity and delivering impressive scientific results. The UCG congratulates Gemini for these accomplishments, particularly the integration of the two front-end modules, which further enhances their capabilities. Looking ahead, the UCG is mindful of the large data volumes that will be generated, especially from the upcoming MAROON-X solar feed, and suggests considering integration with existing databases like NExScI, which already hosts solar RV data of various levels (1-D spectra to derived RV measurements) from other RV instruments like NEID and EXPRES.

The UCG also applauds the development of IGRINS-2 and is excited about the contributions from the Korean community to Gemini's future. Moving forward, the UCG recommends that Gemini continue to carve out space for new visitor instrumentation that brings innovative and unique capabilities to the observatory. Gemini's upcoming suite of instruments (SCORPIO, GIRMOS, and GPI2) are particularly exciting and should receive continued strong developmental support. However, the UCG expresses concern that with the limited resources available, the observatory's instrument development efforts are becoming stretched thin. To maintain momentum, the UCG strongly endorses the recruitment of additional resources to Gemini.

The UCG also notes the impressive demand for GMOS at both Gemini North and South, despite the instruments' aging status. This highlights the need for a successor to the versatile "Swiss army knife" capabilities of GMOS, particularly at GMOS-N. The UCG requests that at the next meeting, Gemini provide more concrete plans on how it intends to address this gap, especially given the uncertainty surrounding a replacement.

GIRMOS in particular holds great promise as a powerful new instrument, and the UCG is excited to see its development progress. However, the UCG is concerned about the existing funding gap, which could potentially delay the instrument's timeline. Since GIRMOS is complementary to JWST, any significant delay beyond 2028 could result in a lost opportunity to overlap with the capabilities of JWST, given its finite lifetime. Additionally, due to the complexity and versatility of GIRMOS, the UCG emphasizes the need for robust software development to support its operation. The committee endorses providing extra resources to the DRAGONS team to ensure that the necessary data reduction software will be available when GIRMOS comes online.

Data Reduction Packages and Gemini Proposal Platform Updates

The UCG recognizes the significant progress made in developing the DRAGONS data reduction software, noting the considerable strides achieved since the last meeting in 2022. Streamlining the data reduction process is essential for enhancing the usability and effectiveness of Gemini's instruments, helping to overcome barriers for new users and ensuring the observatory remains accessible to a broad scientific community. However, the UCG believes that there are still gaps in resources dedicated to these efforts. While the DRAGONS team has made commendable progress, they are currently working at full capacity and will not be able to meet future demands without additional support. Therefore, the UCG strongly endorses the allocation of more resources to Gemini to ensure the continued success of these software development goals.

To avoid recurring challenges, the UCG emphasizes that, to the maximum extent feasible, a comprehensive suite of data reduction software should be considered an integral part of future instrument development. Adequate budgets for this purpose should be secured before a new

instrument concept is accepted, ensuring that data reduction capabilities are not treated as a contingency but as a core component of the development process.

In terms of priorities, the UCG recommends the completion of:

- 64-bit IRAF;
- full DRAGONS support for all Gemini instruments; and;
- the development of functional data reduction tools for various IFU modes.

Additionally, The UCG is very impressed with the progress made on the GPP tool and congratulates the software team on their success. PIs will greatly benefit by its implementation, and the UCG recommends prioritizing a near-future rollout of a functional (if not yet fully complete) GPP that can be improved over time with added features, albeit at a lower priority than data reduction software.

The UCG also highlights a critical issue regarding the availability and quality of data reduction software, particularly when it comes to missing, incomplete, or insufficient documentation for existing software tools. The committee strongly urges the directorate to prioritize addressing this gap and recommends that the development of consistent, high-quality documentation for all software tools be made a priority. This documentation should match the excellence of the DRAGONS team's efforts and should be incorporated into workforce planning moving forward.

To help meet these software development goals, the UCG suggests exploring the possibility of subcontracting software developers from countries outside of North America and Chile, as a potential solution to the staffing challenges currently facing Gemini. This could help alleviate some of the pressure on the existing team and ensure that software development keeps pace with the observatory's growing needs.

Community Engagement

The UCG recognizes community engagement as a pillar of Gemini's success in the astronomical community and emphasizes the importance of continuing these efforts. One potential initiative is the introduction of "office hours" for instrument scientists and Gemini staff, where they could be available via Zoom once or twice a month for spontaneous engagement, program support, and Q&A sessions with the user community. This would foster direct, accessible interaction and improve user support. Additionally, the UCG recommends re-engaging in providing video tutorials and workshops that accompany the deployment of GPP and DRAGONS; such initiatives have proven to be highly popular in the past. These resources would bolster Gemini's support for users, with the up-front investment in developing them yielding long-term benefits.

Embedding video tutorials within software tools like the GPP could further streamline user support, especially if testing by NGOs helps identify areas of complexity. Such resources could ultimately alleviate pressure on the user support department by providing self-help tools that

address common issues. The UCG also suggests finding solutions to improve communication on the current status of instruments and upcoming offerings, particularly for early-career researchers. This could include webinars or half-day remote workshops, with presentations from both Gemini staff and community members, such as ECRs sharing their successful programs. Additionally, platforms like Slack or Discord could be used for spontaneous engagement, moderated by Gemini staff.

To enhance Gemini's community support, the UCG recommends exploring the possibility of centralized resources shared with other observatories, creating a "one-stop shop" for documentation of observatory capabilities. This could better serve overlapping user communities and streamline access to important information. Finally, the UCG commends Gemini's ongoing outreach efforts on Hawai'i Island, which remain a core part of its mission. These local community engagement initiatives should continue to be prioritized and further developed.

Gemini Usage and Subscription Trends

The UCG is pleased to see that over-subscription rates for Gemini remain relatively high across partner countries, a positive indicator that Gemini continues to be scientifically competitive. This success is largely due to the efforts of both Gemini and the NGOs, who work hard to ensure that the observatories stay at the forefront of astronomical research. The UCG is also excited by the increase in publication rates based on Gemini data, particularly from smaller partner countries, which highlights the growing impact of Gemini's capabilities within the global scientific community.

A key driver of this continued success is the growing interest in Gemini's newer instruments, such as GHOST, MAROON-X, and IGRINS-2. This surge in demand is a clear sign that Gemini is heading in the right direction, with its innovative instrumentation meeting the needs of the community. However, the UCG has noted a concerning decline in oversubscription in some NGOs, particularly in Canada. While this could be attributable to recent events, such as the GN shutdown, the end of NIFS, or the cyberattack, it is important to understand the underlying cause of this decline. Whether these events are responsible or if other factors are at play, if the trend continues in future semesters, resources should then be spent identifying the reason for the drop in demand so that strategies can be found to address it.

In addition to Gemini's scientific offerings, the UCG highlights the observatory's supportive culture, which has been fostered by its scientists. This culture is a key element in maintaining high subscription rates and is instrumental in reversing any declining trends. The UCG strongly encourages the continuation of this positive environment, as it helps ensure that Gemini remains a highly sought-after resource for the global astronomical community.

Updates and Response to 2022 UCG

The UCG expresses its sincere gratitude to the entire Gemini staff for their exceptional work in organizing the 2024 UCG Meeting in Hilo. The effort invested in preparing the presentations was

clearly significant and deeply appreciated by the committee. Additionally, the UCG values the time allocated for closed-door meetings at the beginning of the session and at key points throughout the meeting, which proved to be beneficial for the committee's discussions and decision-making. This practice should continue at future UCG meetings to ensure productive and focused dialogue. Additionally, the UCG valued the opportunity to meet directly with the OpsWG as well as the individual NGO reports and interactions. This format should be repeated at future meetings.

While some aspects of the meeting, such as preparing the outbrief, felt rushed, the two-day format was generally sufficient to accomplish the necessary tasks. The UCG recommends that this timeframe be maintained for future meetings, as it strikes an appropriate balance between addressing all key issues and maintaining efficient use of time.

The UCG also appreciates the efforts made to address concerns and recommendations raised at the 2022 UCG meeting. Despite some setbacks and adjustments to timelines, the committee is pleased with the progress made on important priorities such as the DRAGONS and GPP software developments. While the committee believes faster progress can be made, it reiterates that achieving this goal will require the allocation of sufficient resources to support the software teams and ensure they can continue to meet growing demands.

The UCG acknowledges the challenges faced by Gemini in expanding its user base, particularly in the context of competition from leading observatories like JWST, ALMA, Euclid, and upcoming facilities such as Roman and Rubin. There is some concern about flat or declining subscription rates for Gemini, which could suggest that efforts to broaden the user base have not been as successful as hoped. The committee recommends that efforts be made to identify the root causes of these trends. Until these causes are clearly understood, the UCG supports continuing the strategic focus on increasing flexibility and versatility, which remains a key strength of Gemini.